Intelligent Fan Controller

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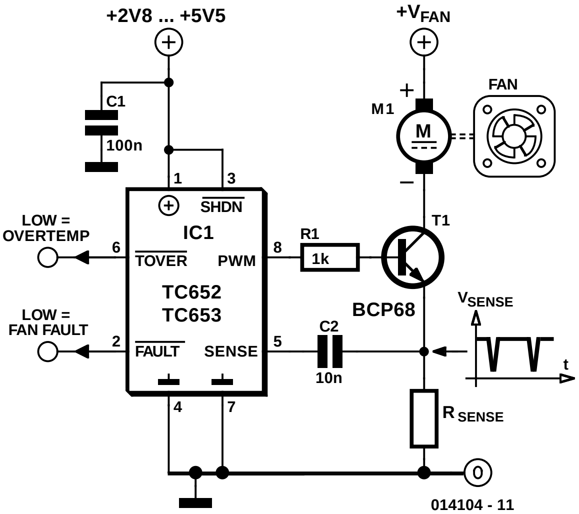

The commutation of a fan motor as the rotor moves from one pole to the next can be clearly observed as pulses in its current consumption. This property is exploited by the TC652 and TC653 fan controller ICs from Microchip Technology (www.microchip.com). The 'FanSense' feature, as the manufacturer calls it, derives an error signal from the commutation pulses. The devices also detect if the fan is jammed or has failed by the absence of these pulses. Resistor R_{sense} should be chosen so that about 0.5 V is dropped across it at the nominal fan current.

The fan is controlled via a switching transistor which is driven with a 15 Hz PWM (pulse width modulated) signal from the IC. The duty cycle of the signal is set to one of six values by the TC652/3. Below an internally set threshold temperature the duty cycle is set to 40% and then rises in six steps to 100%. The 100% threshold temperature is also preset by the manufacturer. The following temperature options are available:

Code letter	A	B	C	D	E	F	G
Temperature in °C	25	30	35	40	45	50	55

The code letters form part of the order code for the device. The first code letter indicates the temperature threshold for 40% duty cycle operation, the second for 100%. The following preferred combinations are available (for the TC653 as well):

TC 652 AC	25 °C to 35 °C
TC 652 AE	25 °C to 45 °C
TC 652 BE	30 °C to 45 °C
TC 652 AG	25 °C to 55 °C

The TC653 also provides an auto-shutdown mode, where the fan is turned off completely below the lower temperature threshold (duty cycle = 0%), where the TC652 would operate at 40%.

A further feature of the fan controller is an over-temperature output. This is an active low output on the TC652/3 which indicates when the temperature is more than 10 °C higher than the upper threshold. The IC operates from a power supply of between 2.8 V and 5.5 V and consumes less than 100 µA (excluding its PWM output).

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